

Borehole

50-01-12**Log Event A****Borehole Information**

Farm : <u>T</u>	Tank : <u>T-101</u>	Site Number : <u>299-W10-105</u>
N-Coord : <u>43,692</u>	W-Coord : <u>75,637</u>	TOC Elevation : <u>673.46</u>
Water Level, ft : <u>87.6</u>	Date Drilled : <u>7/31/1973</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.237</u>	ID, in. : <u>4</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>92</u>	
Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>92</u>	

Cement Bottom, ft. : 92 Cement Top, ft. : 0

Borehole Notes:

Borehole 50-01-12 was drilled in July 1973 and completed to a depth of 92 ft using 6-in.-diameter casing. In 1980, the original 6-in. casing was perforated from 0 to 20 ft and 90 to 92 ft, a 4-in. casing was installed inside the 6-in. casing, and the annular space was filled with grout.

The zero reference for the SGLS was the top of the 4-in. casing, which is approximately even with the ground surface.

Equipment Information

Logging System : <u>2B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency : <u>35.0 %</u>
Calibration Date : <u>11/1997</u>	Calibration Reference : <u>GJO-HAN-20</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>07/07/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>16.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>07/08/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>15.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>77.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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Log Run Number :	<u>3</u>	Log Run Date :	<u>07/09/1998</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>89.5</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>76.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>4</u>	Log Run Date :	<u>07/09/1998</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>75.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>60.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Logging Operation Notes:

This borehole was logged in four log runs. Log run four (60 to 75 ft) was a repeat log run performed for quality assurance purposes. The total logging depth reached by the SGLS was 89.5 ft. A water level indicator measured standing water at 87.6 ft.

Analysis Information

Analyst : R.R. SpatzData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 12/01/1998**Analysis Notes :**

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

The casing correction factor for a 0.517-in.-thick steel casing was applied to the concentration data during the analysis process. A grout correction was not made because none is available. A general water correction was applied to the water-filled interval in the bottom 2 ft of the borehole.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

The interval between 60 and 75 ft was relogged as an additional quality check and to demonstrate the repeatability of the radionuclide concentration measurements made by the SGLS. The radionuclide



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concentrations were calculated using separate data sets provided by the original and rerun logging runs. A plot comparing the two data sets is included.

A plot that compares spectral gamma-ray data from a 1992 RLS survey and a 1998 SGLS survey is included.

A time-sequence plot of selected historical gross gamma-ray data collected between 1975 and 1994 is also included.

Results/Interpretations:

The radionuclide concentrations identified in this section are reported as apparent concentrations only and are underestimated.

The man-made radionuclides Cs-137, Co-60, and Eu-154 were detected around this borehole by the SGLS. The Cs-137 contamination was detected sporadically from the ground surface to 6 ft at apparent concentrations ranging from 0.15 to 0.45 pCi/g. The maximum apparent Cs-137 concentration for this borehole was 0.45 pCi/g detected at the ground surface.

Co-60 contamination was detected continuously from 35.5 to 38 ft at apparent concentrations ranging from 0.7 to a peak concentration of 0.24 pCi/g.

Eu-154 contamination was detected at 36 ft at an apparent concentration of 0.27 pCi/g.

K-40 concentrations are slightly variable from the ground surface to 38 ft and range between 9 and 11 pCi/g. The K-40 concentrations increase to about 13 pCi/g between 38 and 49 ft. From 49.5 ft to the top of the water (87.6 ft) the K-40 concentrations steadily increase from about 10 to 14 pCi/g. Below 87.6 ft, the K-40 concentrations decrease to about 11 pCi/g. U-238 and Th-232 concentrations increase below 82 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank T-101.